Techno-economic evaluation of the high-integrated system for value-added chemical production from cokeoven gas and linz-donawitz gas

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This study aims to develop new processes for methanol and hydrogen production from cokeoven gas (COG) and linz-donawitz gas (LDG). The COG and LDG, which contain a large amount of high-calorie compounds are one of the promising substitutes to natural gas as a fuel for heating or power generation on site. It is attractive to use the COG and LDG as a resource for the production of high-value chemicals (i.e. hydrogen and MeOH). We develop novel processes with co-feeding LDG and COG, which show improved technical and economic performances compared to LDG-dedicated or COG-dedicated systems. Such improvements are achieved through precise integration of the involved technologies for addressing the drawbacks of the single feeding systems, such as imbalance between carbon and hydrogen elements. The developed processes are analyzed and evaluated using different criteria (e.g. energy efficiency and economics) using the simulation results. As a result, we discuss the most favorable process scheme and configuration along with the optimal strategies for the energy-efficient process operation forward high-value chemical production.